CLAIM AMENDMENTS

1. (currently amended) A method for calibrating a phase locked loop, the method comprises:

performing an open loop calibration of a voltage controlled oscillator to produce an open loop calibrated voltage controlled oscillator;

determining a gain offset of ~~a~~ the open loop calibrated voltage controlled oscillator of the phase locked loop; and

adjusting current of a charge pump of the phase locked loop based on the gain offset.

2. (cancelled)

3. (original) The method of claim 1, wherein the determining the gain offset further comprises:

measuring a control voltage of the voltage controlled oscillator when a reference oscillation is inputted to the phase locked loop to produce a first measured control voltage;

injecting a frequency offset into the phase locked loop;

measuring the control voltage of the voltage controlled oscillator to produce a second measured controlled voltage; and

determining the gain offset based on the frequency offset, the first measured control voltage and the second measured control voltage.

4. (original) The method of claim 3 further comprises:

waiting for expiration of a settling period after injecting the frequency offset before measuring the control voltage.

5. (original) The method of claim 3 further comprises:

injecting a second frequency offset into the phase locked loop;

measuring the control voltage of the voltage controlled oscillator to produce a third measured controlled voltage; and

determining the gain offset based on the frequency offset, the second frequency offset, the first measured control voltage, the second measured control voltage, and the third measured control voltage.

6. (original) The method of claim 5 further comprises:

waiting for expiration of a settling period after injecting the second frequency offset before measuring the control voltage.

7. (original) The method of claim 1, wherein the adjusting current of a charge pump further comprises:

converting the gain offset to a digital value;

interpreting the digital value to determine a current adjust value; and

adjusting input to at least one dependent current source of the charge pump based on the current adjust value.

8. (currently amended) An auto-calibrating phase locked loop comprises:

phase and frequency detection module operably coupled to produce an up signal when at least one of phase and frequency of a reference oscillation leads at least one of phase and frequency of a feedback oscillation and to produce a down signal when the at least one of phase and frequency of the feedback oscillation leads the at least one of phase and frequency of the reference oscillation;

charge pump circuit operably coupled to convert the up signal and down signal into a current signal;

loop filter operably coupled to convert the current signal into a control voltage;

voltage controlled oscillator operably coupled to convert the control voltage into an output oscillation, wherein the feedback oscillation is derived from the output oscillation; and

calibration module operably coupled to:

perform an open loop calibration of the voltage controlled oscillator to produce an open loop calibrated voltage controlled oscillator;

determine a gain offset of ~~a~~ the open loop calibrated voltage controlled oscillator; and

adjust at least one dependent current source of the charge pump based on the gain offset.

9. (cancelled)

10. (original) The auto-calibrating phase locked loop of claim 8, wherein the calibration module further functions to determine the gain offset by:

measuring a control voltage of the voltage controlled oscillator when a reference oscillation is inputted to the phase locked loop to produce a first measured control voltage;

injecting a frequency offset into the phase locked loop;

measuring the control voltage of the voltage controlled oscillator to produce a second measured controlled voltage; and

determining the gain offset based on the frequency offset, the first measured control voltage and the second measured control voltage.

11. (original) The auto-calibrating phase locked loop of claim 10, wherein the calibration module further functions to:

wait for expiration of a settling period after injecting the frequency offset before measuring the control voltage.

12. (original) The auto-calibrating phase locked loop of claim 10, wherein the calibration module further functions to:

inject a second frequency offset into the phase locked loop;

measure the control voltage of the voltage controlled oscillator to produce a third measured controlled voltage; and

determine the gain offset based on the frequency offset, the second frequency offset, the first measured control voltage, the second measured control voltage, and the third measured control voltage.

13. (original) The auto-calibrating phase locked loop of claim 12, wherein the calibration module further functions to:

wait for expiration of a settling period after injecting the second frequency offset before measuring the control voltage.

14. (original) The auto-calibrating phase locked loop of claim 8, wherein the calibration module further functions to adjust the at least one dependent current source by:

converting the gain offset to a digital value;

interpreting the digital value to determine a current adjust value; and

adjusting input to at least one of the at least one dependent current source based on the current adjust value.

15. (original) The auto-calibrating phase locked loop of claim 8, wherein the reference oscillation further comprises at least one of:

a frequency shift keying modulated signal;

a phase shift keying modulated signal; and

a M shift keying modulated signal.

16. (currently amended) A radio transmitter comprises:

phase and frequency detection module operably coupled to produce an up signal when at least one of phase and frequency of an input modulated signal leads at least one of phase and frequency of a feedback oscillation and to produce a down signal when the at least one of phase and frequency of the feedback oscillation leads the at least one of phase and frequency of the input modulated signal;

charge pump circuit operably coupled to convert the up signal and down signal into a current signal;

loop filter operably coupled to convert the current signal into a control voltage;

voltage controlled oscillator operably coupled to convert the control voltage into a radio frequency oscillation, wherein the feedback oscillation is derived from the radio frequency oscillation; and

calibration module operably coupled to:

perform an open loop calibration of the voltage controlled oscillator to produce an open loop calibrated voltage controlled oscillator;

determine a gain offset of ~~a~~ the open loop calibrated voltage controlled oscillator; and

adjust at least one dependent current source of the charge pump based on the gain offset.

17. (cancelled)

18. (original) The radio transmitter of claim 16, wherein the calibration module further functions to determine the gain offset by:

measuring a control voltage of the voltage controlled oscillator when a reference oscillation is inputted to the

phase locked loop to produce a first measured control voltage;

injecting a frequency offset into the phase locked loop;

measuring the control voltage of the voltage controlled oscillator to produce a second measured controlled voltage; and

determining the gain offset based on the frequency offset, the first measured control voltage and the second measured control voltage.

19. (original) The radio transmitter of claim 18, wherein the calibration module further functions to:

wait for expiration of a settling period after injecting the frequency offset before measuring the control voltage.

20. (original) The radio transmitter of claim 18, wherein the calibration module further functions to:

inject a second frequency offset into the phase locked loop;

measure the control voltage of the voltage controlled oscillator to produce a third measured controlled voltage; and

determine the gain offset based on the frequency offset, the second frequency offset, the first measured control

voltage, the second measured control voltage, and the third measured control voltage.

21. (original) The radio transmitter of claim 20, wherein the calibration module further functions to:

wait for expiration of a settling period after injecting the second frequency offset before measuring the control voltage.

22. (original) The radio transmitter of claim 16, wherein the calibration module further functions to adjust the at least one dependent current source by:

converting the gain offset to a digital value;

interpreting the digital value to determine a current adjust value; and

adjusting input to at least one of the at least one dependent current source based on the current adjust value.

23. (original) The radio transmitter of claim 16, wherein the input modulated signal further comprises at least one of:

a frequency shift keying modulated signal;

a phase shift keying modulated signal; and

a M shift keying modulated signal.